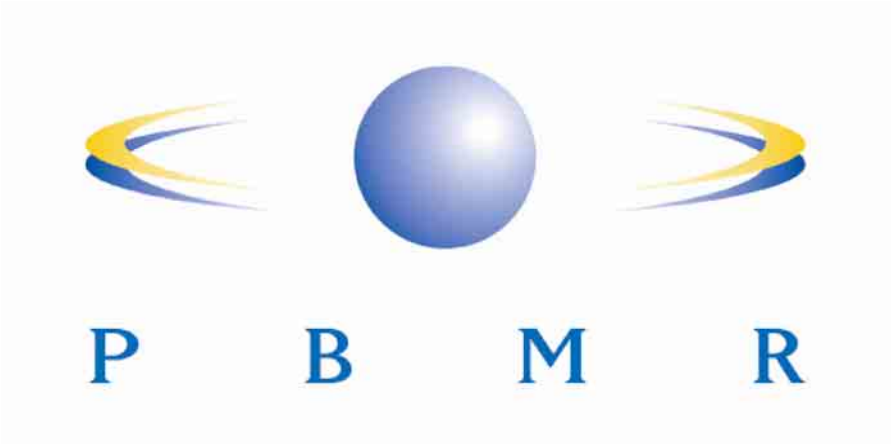


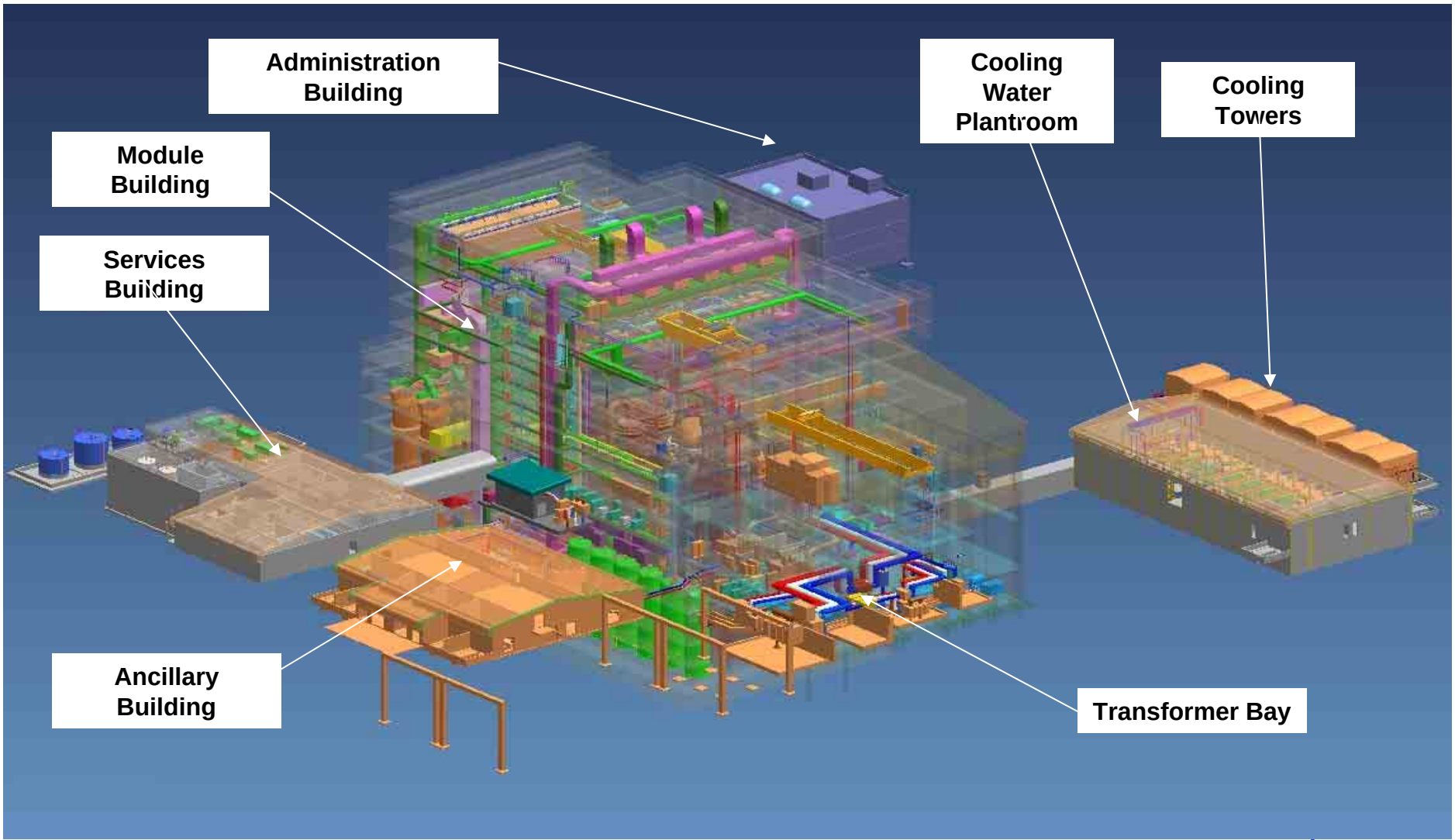
Civil Structures and Equipment Arrangements

Johan Slabber

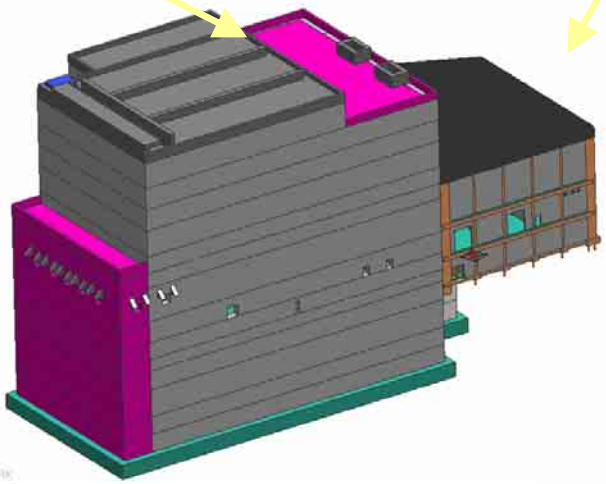
Discussion Topics

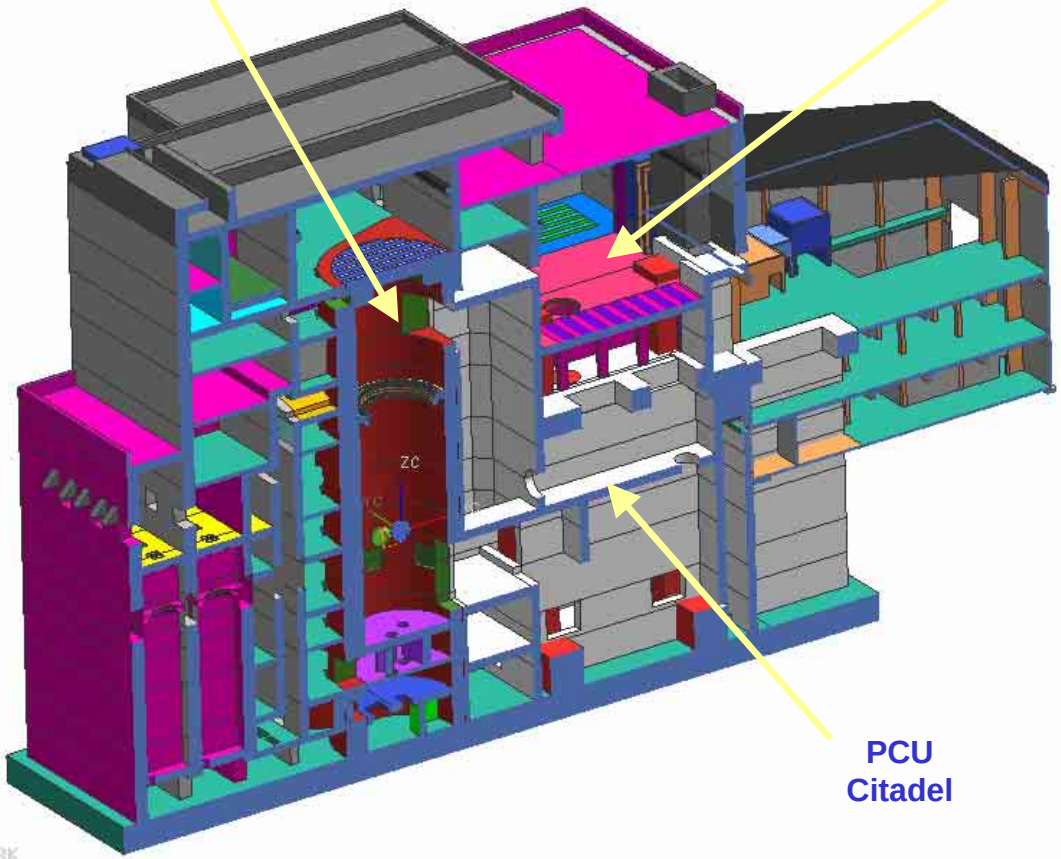
- **Site Arrangement**
- **Reactor Building**
  - Containment System
  - Citadel
  - Conventional Island
- **Auxiliary Buildings**
- **General Arrangements**

Site Buildings



Reactor Building





SPECIFICATION

Height total	65.3 m
Height above ground	42.8 m
Depth below ground	22.5 m
Width	37 m
Total width (loading bay included)	46m
Length NI	67m
Length NI (SSS additional)	74m
Length CI	36m
Total length (CI included)	110m

External Loads

The following external loads are considered in the plant design:

- Wind Loads
- Tornado Loads
- Atmospheric Temperature Loads
- Precipitation Loads (rainfall and snow)
- External Flood Loads
- Internal Flood Loads
- Missile Loads
- Aircraft Crash Loads
- Seismic Loads (Safe Shutdown Earthquake [SSE] = 0.4 g Peak Ground Acceleration (PGA) horizontal and 0.27 g PGA vertical (under review for DPP))

The Containment System is comprised of:

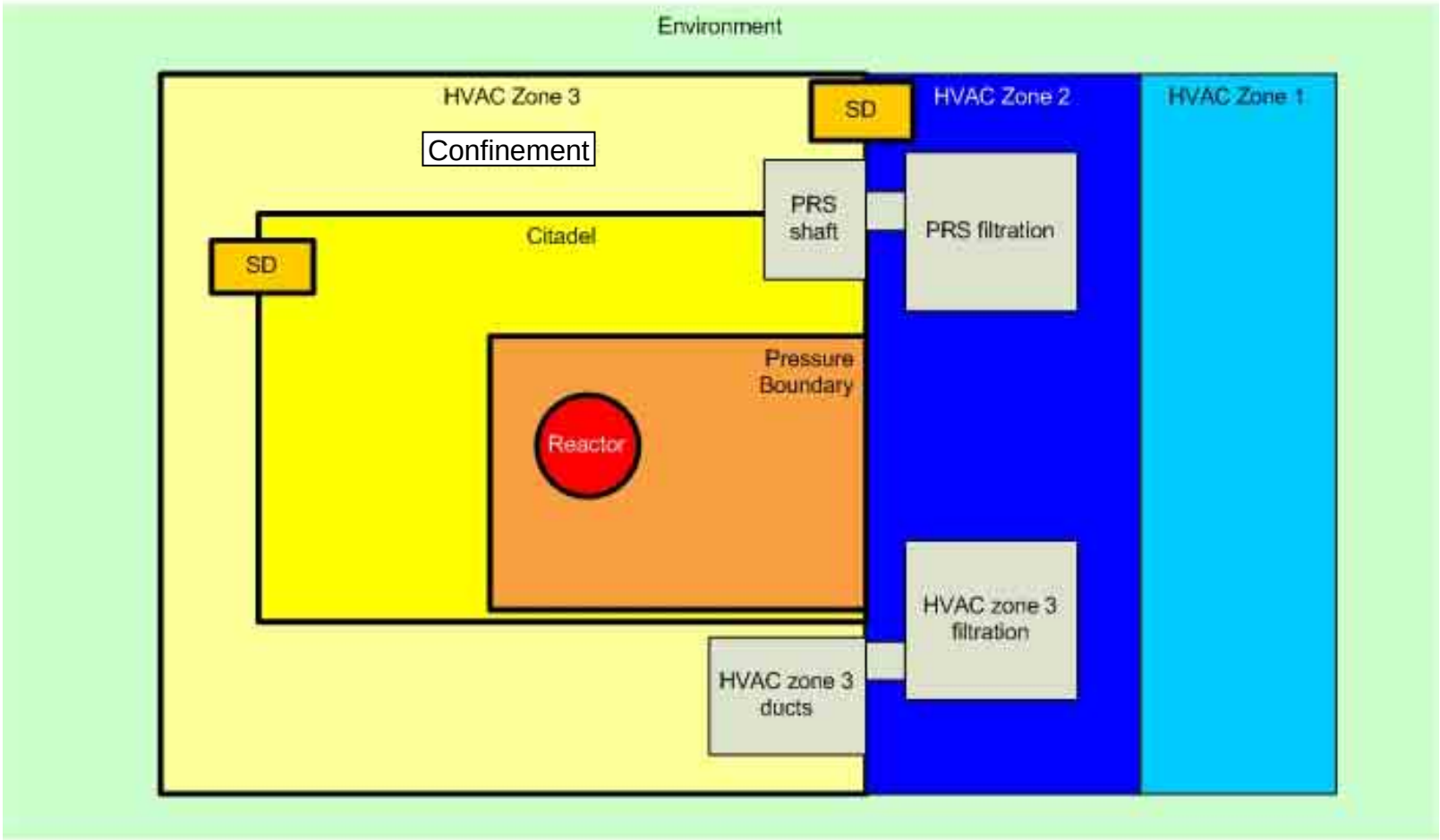
- Citadel
  - *Reactor Cavity*
  - *PCU Citadel*
- Vented Confinement Building
- Pressure Relief System
- Specialized Doorways Subsystem
- HVAC System Filtration

Containment System Functions

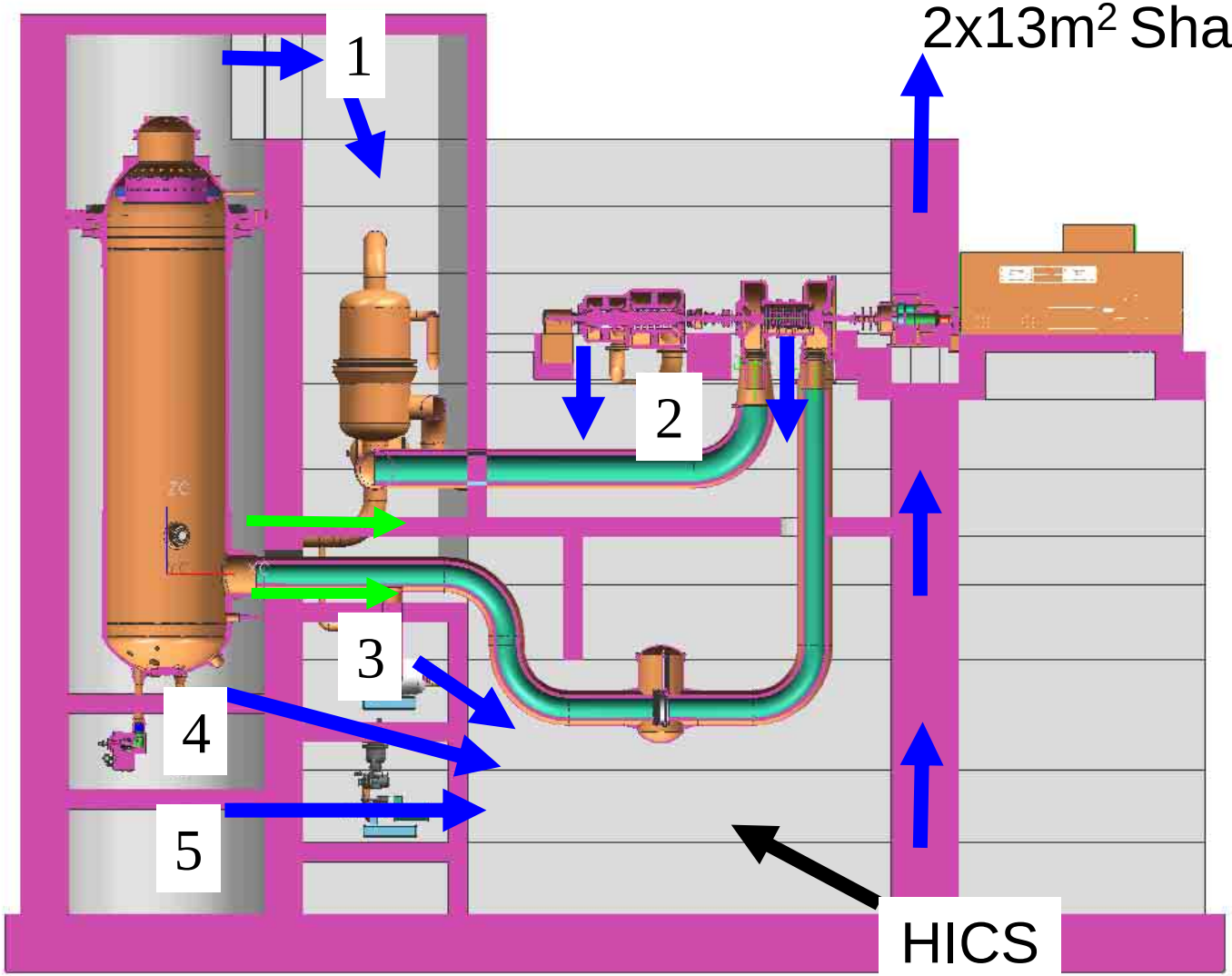
Containment System functions include:

- Protection of reactor, spent fuel, and safety related SSCs from external loads and missiles
- Protection of the reactor, spent fuel, and safety related SSCs from high energy HPB breaks and other internal hazards (e.g. fires and floods)
- Mitigation of fission product releases via vented and filtered confinement approach
- Limit air ingress to the MPS following a HPB breach
- Additional functions to support access, maintenance, personnel safety, and health physics

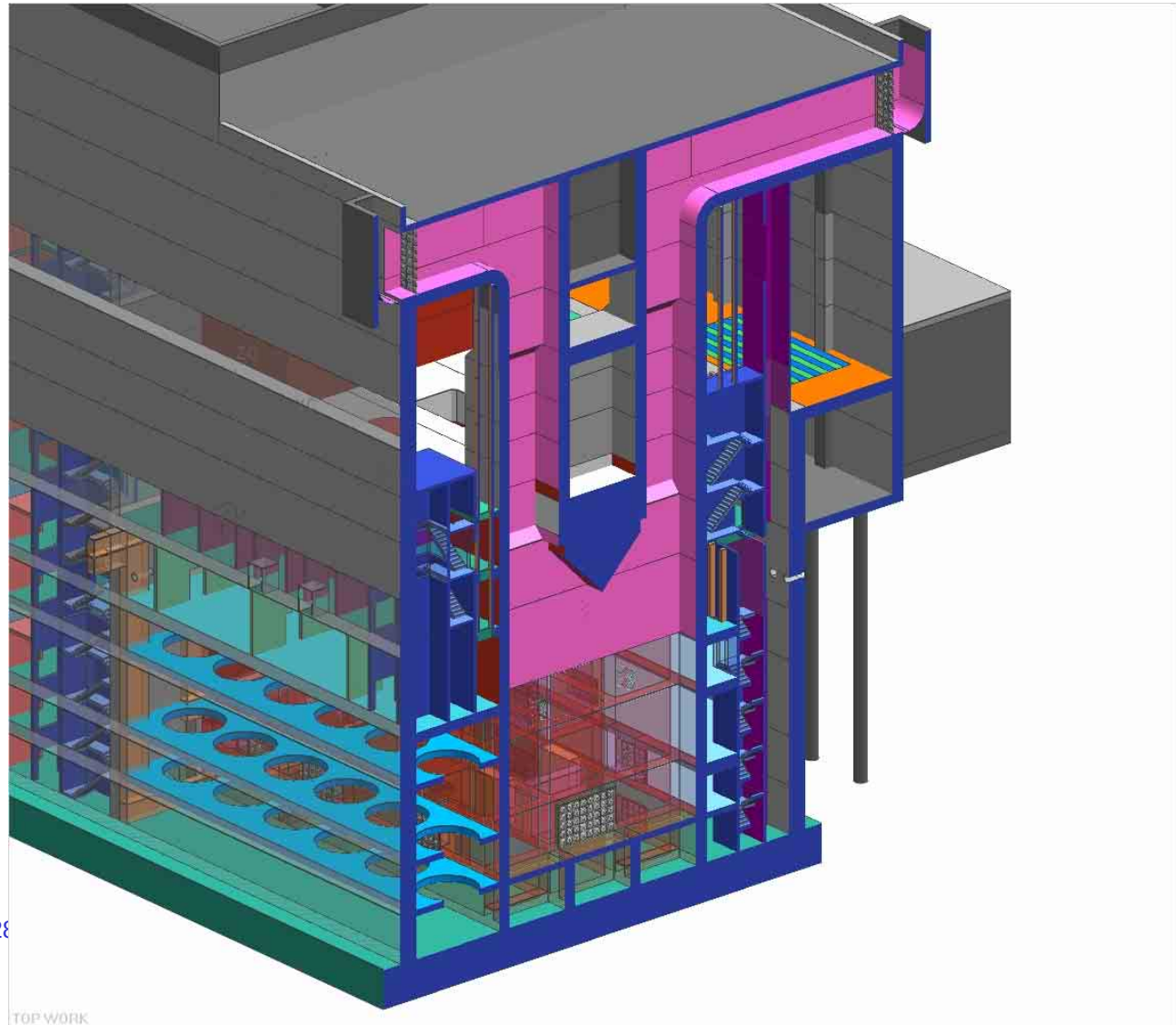
Confinement Philosophy



Depressurization Routes



Vent Shaft Layout



The functions of the Specialized Doors include:

- Facilitate access to reactor building areas
- Support building confinement functions
  - *Limit air ingress into the Citadel, post event, for HPB breaks*
  - *Limit the release of fission products to atmosphere*
- Support zoning within reactor building
  - *Fire*
  - *Flood*
  - *PRS pressure*
  - *HVAC static pressure zones*
  - *Radiation protection*

Conventional Island (Generator House)

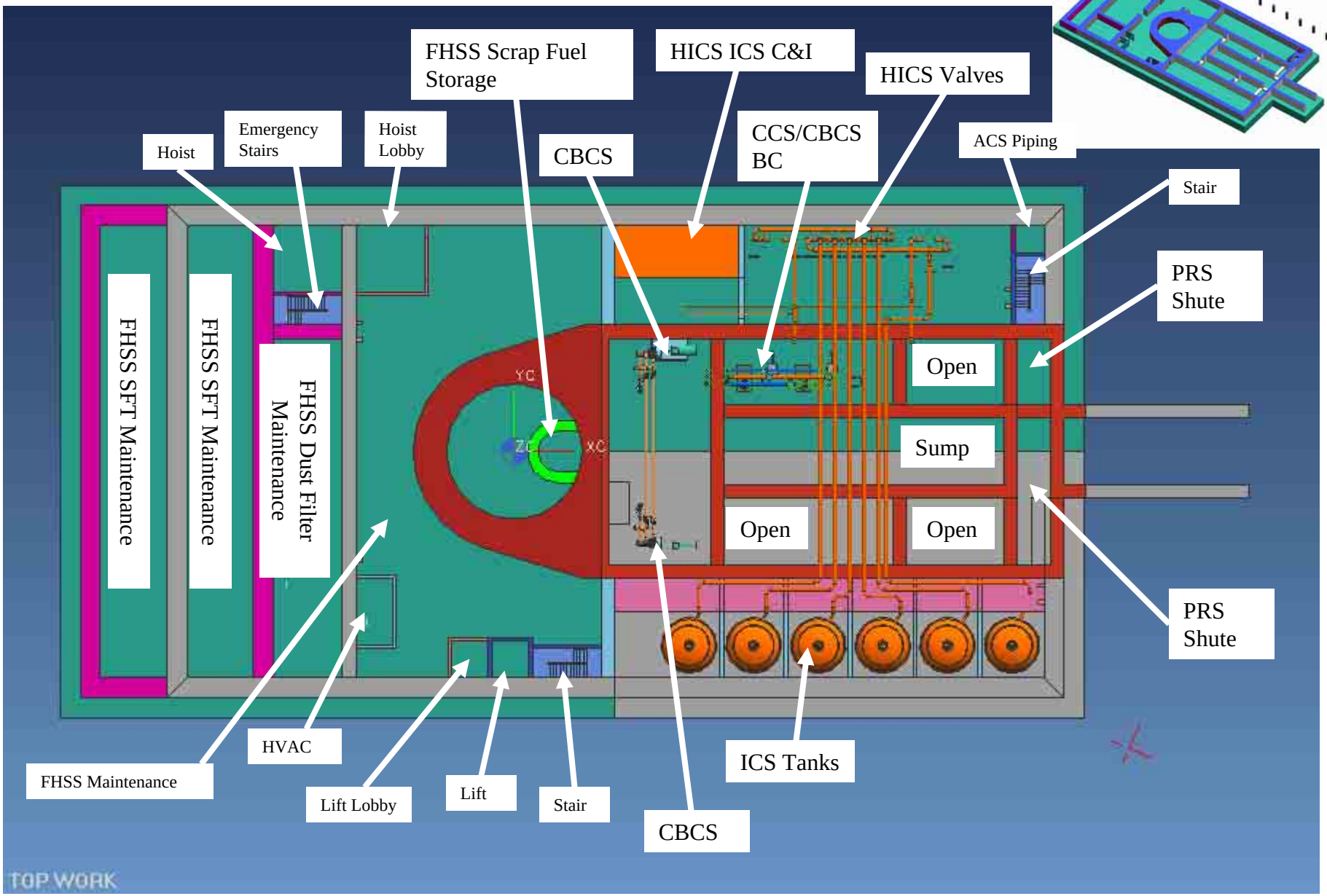
The Generator House performs the following primary functions:

- Provides access to the generator during operation and maintenance
- Houses the ancillary plant serving the generator, e.g. breaker, SFC
- Houses the generator transformer and unit transformer bussbars
- Houses the two redundant trains of electrical systems interfacing with the Nuclear Island
- Houses the two lube oil systems serving the turbine, compressors and generator in the controlled and non-controlled areas

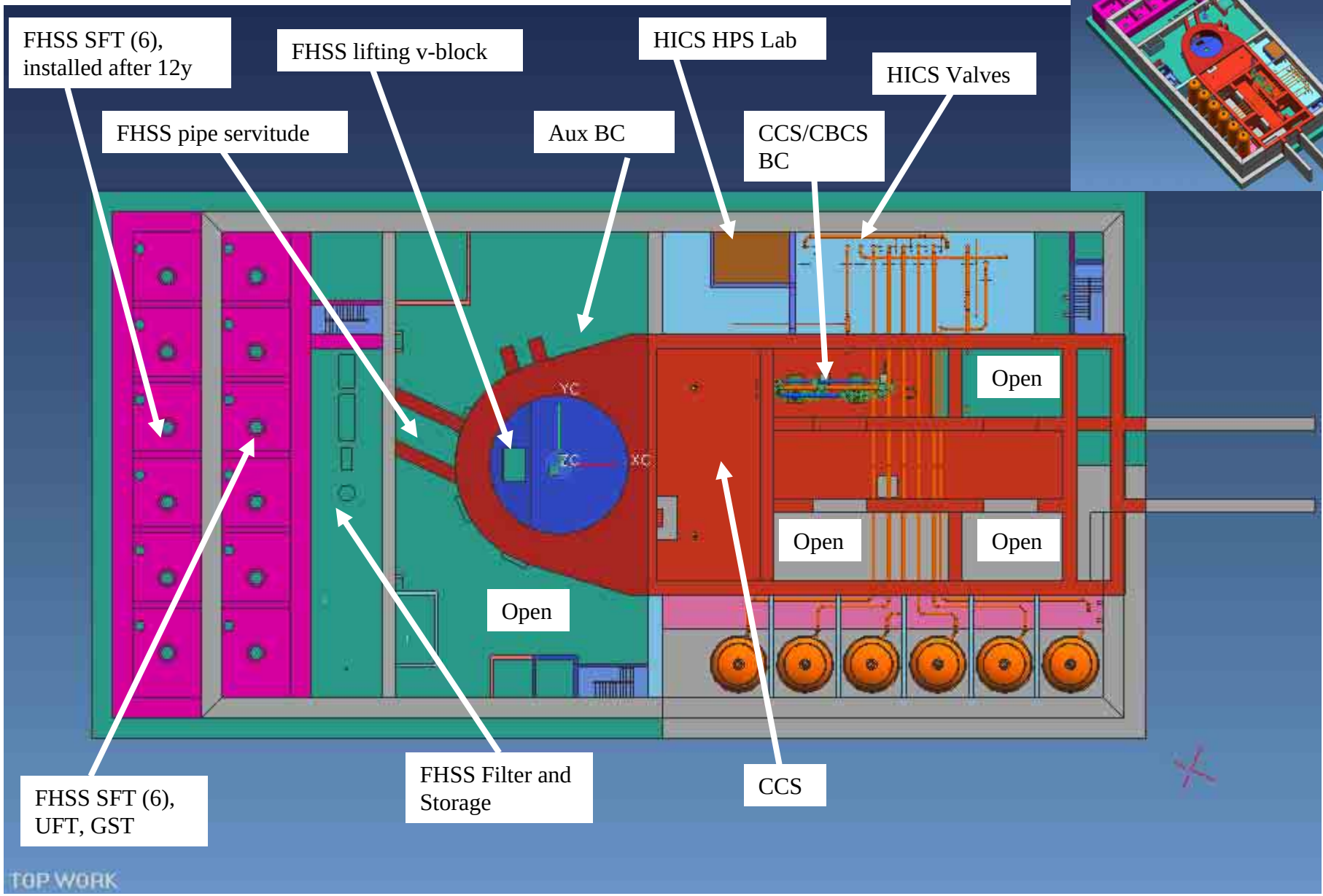
Auxiliary Buildings

- Diesel Generator Building
- Diesel Fuel Building
- Lube Oil Storage Building
- Cooling Water (CW) Plant Room
- Fire Pump House
- Fire Protection System (FPS) Water Storage Tanks

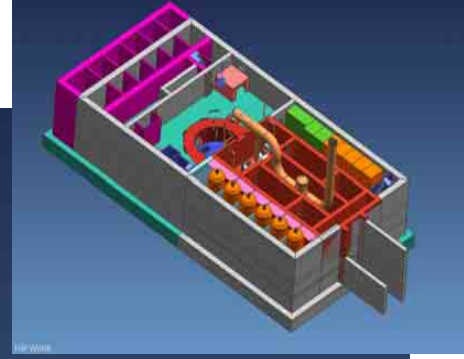
Level –22.5m


FHSS Scrap Fuel Storage
HICS ICS C&I
HICS Valves
Hoist
Emergency Stairs
Hoist Lobby
CBCS
CCS/CBCS BC
ACS Piping
Stair
PRS Shute
FHSS SFT Maintenance
FHSS SFT Maintenance
FHSS Dust Filter Maintenance
Open
Sump
Open
Open
PRS Shute
HVAC
FHSS Maintenance
Lift Lobby
Lift
Stair
CBCS
ICS Tanks
TOP WORK

Level –18.75m


FHSS SFT (6), installed after 12y
FHSS lifting v-block
HICS HPS Lab
HICS Valves
FHSS pipe servitude
Aux BC
CCS/CBCS BC
Open
Open
Open
Open
FHSS SFT (6), UFT, GST
FHSS Filter and Storage
CCS
TOP WORK

Level –15.0m



HICS DSRS

HICS DSRS Compressors (2)

HICS ICS Compressors (5)

FHSS pipe servitude

Open

Open

Open

Open

HLW storage

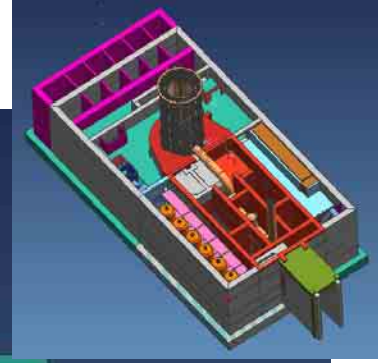
FHSS AGS

FHSS CUD

Hot Outlet Pipe

TOP WORK

Level –9.25m



HICS HPS Main

Special Tools

HICS HPS C&I

FHSS pipe servitude

Open

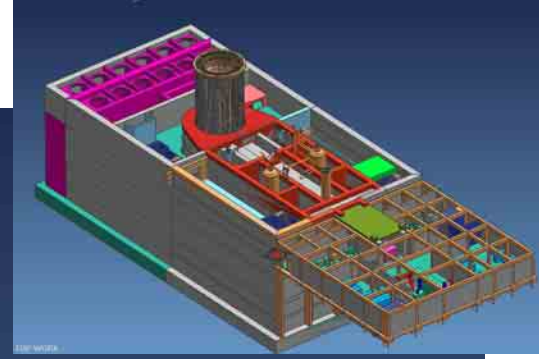
Open

Waste Storage

Open

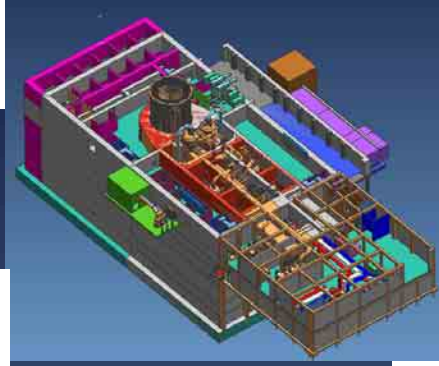
TOP WORK

Level –5.3m



HVAC Top Cavity
HICS DSRS
ACS Pipes
FHSS pipe servitude
HICS ICS Filters (.&2)
HICS HPS Laydown
Open
Open
Open
Open
AEPS Cable Servitude
PLICS Pipe Servitude
CCS/CBCS Power Panels
Inter-cooler
Pre-cooler
Lift
Stair
TOP WORK

Level +0.7m



PEMR

HICS N2 Storage

HICS N inject

HICS HMS

FHSS pipe servitude

HICS HMS Compressor

HICS Cryogenic

Loading Bay (NI)

FHSS Fresh Fuel

Loading Bay (CI)

Open

Open

FHSS SFT Relieve Valves

FHSS SFT Pipes

Controlled Access

Recuperators

PLICS

PEMR Power Supply

TGS Oil System (contaminated

TGS Oil System (un-contaminated

Busbars

Level +5.2m

PEMR
HVAC

PCU
Instrumentation

FHSS pipe servitude

SFT Cooling

Loading Bay (NI)

Instu.
Calibr

Loading Bay
Hatch

Generator
Maintenance

SFT Distribution

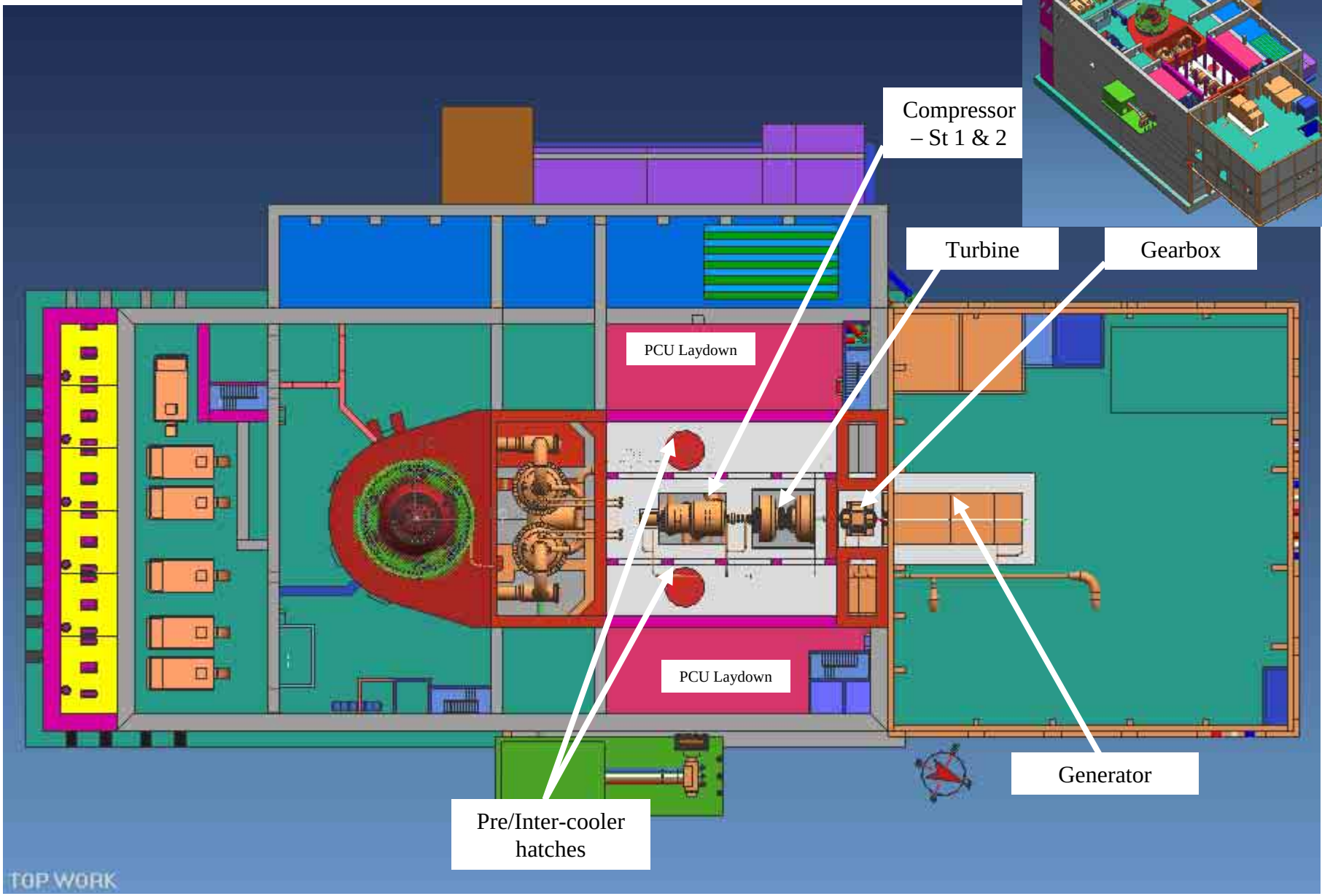
Open

C&I Engineering
room

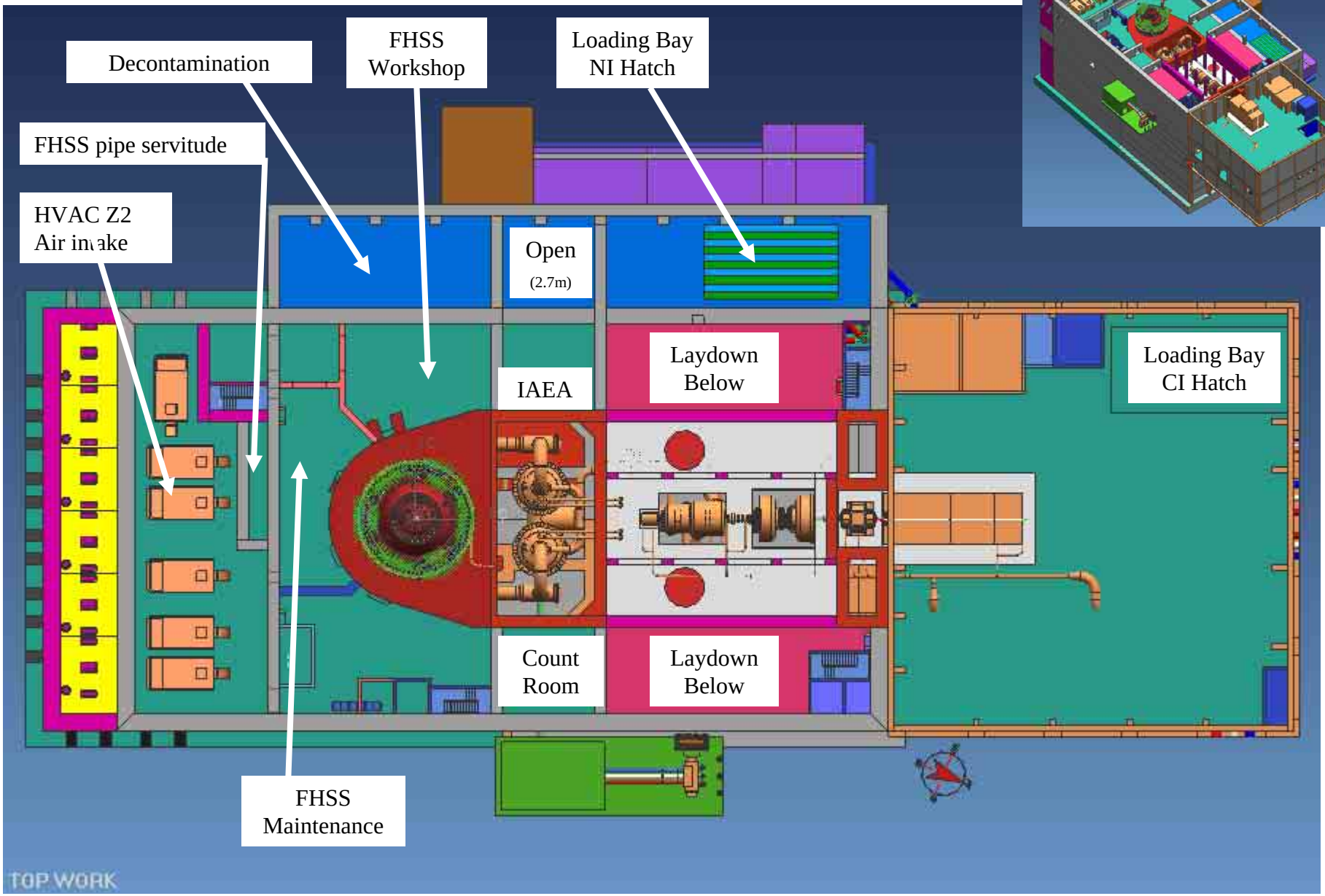
PCU
Instrumentation

TOP WORK

Level +7.8/6.8m


Compressor – St 1 & 2
Turbine
Gearbox
PCU Laydown
PCU Laydown
Generator
Pre/Inter-cooler hatches
TOP WORK

Level +12.3m


Decontamination
FHSS Workshop
Loading Bay NI Hatch
FHSS pipe servitude
HVAC Z2 Air intake
Open (2.7m)
IAEA
Laydown Below
Loading Bay CI Hatch
Count Room
Laydown Below
FHSS Maintenance
TOP WORK

Level +15.5m

Decontamination

FHSS Maintenance

Loading Bay NI Hatch

FHSS pipe servitude

Open

Laydown Hatches

Laydown

RCS ST

Open

Laydown

FHSS Valve Blocks

TOP WORK

Level +19.0m

Contaminated Laydown Area
FHSS Valve Blocks
Laydown Platform
HVAC Z3 Intake
Open
Open
Open
HVAC Access
TOP WORK

Level +24.5m

Contaminated Laydown Area

BUMS

FHSS Valve Blocks

RPS Cabling

RPS

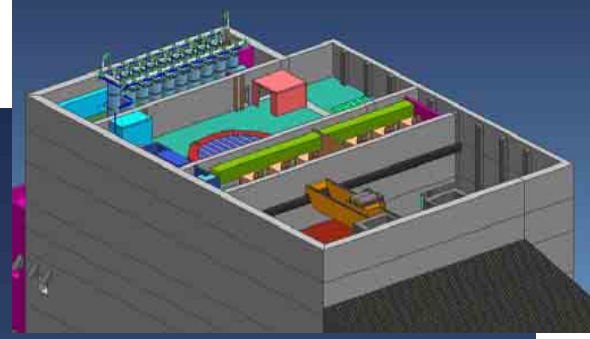
RCCS Tank Pipes

NS

WHS SW Storage

TOP WORK

Level +29.0m



Level +33.5m